



Spectral Gamma-Ray Borehole Log Data Report

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Borehole

50-04-03

Log Event A

Borehole Information

| | | |
|-----------------------------|---------------------------------|----------------------------------|
| Farm : <u>T</u> | Tank : <u>T-104</u> | Site Number : <u>299-W10-146</u> |
| N-Coord : <u>43,552</u> | W-Coord : <u>75,592</u> | TOC Elevation : <u>Unknown</u> |
| Water Level, ft : <u>86</u> | Date Drilled : <u>2/28/1975</u> | |

Casing Record

| | | |
|----------------------------|-------------------------------|--------------------|
| Type : <u>Steel-welded</u> | Thickness : <u>0.237</u> | ID, in. : <u>4</u> |
| Top Depth, ft. : <u>0</u> | Bottom Depth, ft. : <u>90</u> | |
| Type : <u>Steel-welded</u> | Thickness : <u>0.280</u> | ID, in. : <u>6</u> |
| Top Depth, ft. : <u>0</u> | Bottom Depth, ft. : <u>92</u> | |

Cement Bottom, ft. : 90 Cement Top, ft. : 0

Borehole Notes:

Borehole 50-04-03 was drilled in February 1975 to a depth of 92 ft with 6-in. casing. In January 1981, the 6-in. casing string was dislodged during an attempt to perforate a portion of the casing wall. Consequently, a grout collar was installed around the upper 8 ft of the casing to anchor the casing string, which was subsequently perforated from 8 to 20 ft and 88 to 90 ft. A 4-in. casing liner with a metal cap welded on the bottom was positioned inside the 6-in. casing to a depth of 87 ft. The open borehole below the bottom of the 4-in. casing and the entire annulus between the 4-in. and 6-in. casings were filled with grout. The thicknesses of the 4-in. and 6-in. casings are presumed to be 0.237 in. and 0.280 in., respectively, on the basis of the published thickness for schedule-40, 4-in. and 6-in. steel tubing.

Equipment Information

| | | |
|-----------------------------------|---|--|
| Logging System : <u>1B</u> | Detector Type : <u>HPGe</u> | Detector Efficiency: <u>35.0 %</u> |
| Calibration Date : <u>10/1997</u> | Calibration Reference : <u>GJO-HAN-20</u> | Logging Procedure : <u>MAC-VZCP 1.7.10-1</u> |

Logging Information

| | | |
|---------------------------------|----------------------------------|---------------------------------------|
| Log Run Number : <u>1</u> | Log Run Date : <u>05/21/1998</u> | Logging Engineer: <u>Alan Pearson</u> |
| Start Depth, ft.: <u>0.0</u> | Counting Time, sec.: <u>200</u> | L/R : <u>L</u> Shield : <u>N</u> |
| Finish Depth, ft. : <u>54.0</u> | MSA Interval, ft. : <u>0.5</u> | Log Speed, ft/min.: <u>n/a</u> |
| Log Run Number : <u>2</u> | Log Run Date : <u>05/22/1998</u> | Logging Engineer: <u>Alan Pearson</u> |
| Start Depth, ft.: <u>86.5</u> | Counting Time, sec.: <u>200</u> | L/R : <u>L</u> Shield : <u>N</u> |
| Finish Depth, ft. : <u>53.0</u> | MSA Interval, ft. : <u>0.5</u> | Log Speed, ft/min.: <u>n/a</u> |



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Logging Operation Notes:

This borehole was logged by the SGLS in two log runs using a 200-s counting time. The top of the borehole casing, which is the zero reference for the SGLS, is approximately flush with the ground surface. The total logging depth achieved was 86.5 ft.

Analysis Information

Analyst : A.W. Pearson

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 08/24/1998

Analysis Notes :

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

This borehole was completed with 4-in.- and 6-in.-diameter casings along the entire logged interval. A casing correction factor for a 0.50-in.-thick steel casing was applied to the concentration data because it most closely matched the 0.517-in. total combined thickness of the 4-in. and 6-in. casings. The entire annulus between the 4-in. and 6-in. casings is filled with grout, making it impossible to produce accurate radionuclide assays. However, man-made and natural radionuclides were identified and apparent concentrations are reported.

Approximately 1.1 ft of water has collected inside the bottom of this borehole. The appropriate water correction factor was not available so no compensation was applied, resulting in lower man-made and natural radionuclide concentration values along the water-filled interval.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Results/Interpretations:

The radionuclide concentrations identified in this borehole are underestimated and reported as apparent concentrations only.

The man-made radionuclide Cs-137 was detected by the SGLS. The Cs-137 contamination was detected continuously from the ground surface to 30 ft and nearly continuously from 68 ft to the bottom of the logged interval (86.5 ft). A few isolated occurrences of Cs-137 were detected between 30 and 62 ft. A weak zone of



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Cs-137 contamination was measured from 68 ft to the bottom of the borehole.

Almost all of the U-238 concentrations are absent between 0 and 10 ft.

Very low K-40 concentrations were detected between 1 and 7.5 ft. The K-40 concentrations increase from 37.5 to 39 ft. Relatively decreased KUT concentrations were detected between 77 and 80 ft. Increased KUT concentrations occur below about 82 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank T-104.